CLAIMS

What is claimed is:

1. A method of imaging an object using radiation, comprising:

obtaining projection data from at least one real detector array, the at least one real detector array obtaining projection data at two or more positions, and having a geometry that is neither equilinear nor equiangular;

reprojecting the projection data onto a virtual detector array that has a geometry that is either equilinear or equiangular; and

reconstructing the reprojected data from the virtual detector array.

2. The method of Claim 1, wherein the at least one real detector array comprises two or more detectors configured to obtain projection data at two or more positions.

3. The method of Claim 1, wherein the at least one real detector array comprises at least one detector that is movable to obtain projection data at two or more positions.

4. The method of Claim 1, further comprising:

projecting radiation from a source onto the at least one real detector array.

5. The method of Claim 4, wherein the radiation comprises x-ray radiation.

6. The method of Claim 1, wherein the virtual detector array is equilinear.

7. The method of Claim 1, wherein the virtual detector array is equiangular.

8. The method of Claim 1, wherein reprojecting the projection data onto a virtual array comprises:

allocating a virtual array that comprises virtual pixels that are equally-spaced in distance or angle;

for each virtual pixel, determining a corresponding real detector pixel in a real detector array that is intersected by a line connecting the virtual pixel to the source of projected radiation; and

using a radiation amplitude value detected at the corresponding real detector pixel to determine a radiation amplitude value for the virtual pixel.

9. The method of Claim 8, wherein determining a radiation amplitude value for the virtual pixel comprises interpolating a value from the radiation amplitude values of the corresponding real detector pixel and neighboring real detector pixels.

10. The method of Claim 1, further comprising:

filtering data from the virtual detector array; and

backprojecting data from the virtual detector array.

11. The method of Claim 1, wherein the at least one real detector array comprises at least one one-dimensional line detector.

12. The method of Claim 1, wherein the at least one real detector array comprises at least one two-dimensional flat panel detector.

13. A system for imaging an object using radiation, comprising:

a source of radiation;

at least one real detector array that obtains projection data at two or more positions, and has a geometry that is neither equilinear nor equiangular; and

a data process for reprojecting the projection data onto a virtual detector array that has a geometry that is either equilinear or equiangular, and for reconstructing the reprojected data from the virtual detector array.

14. The system of Claim 13, wherein the source comprises an x-ray source.

15. The system of Claim 13, wherein the at least one real detector array comprises at least one one-dimensional line detector.

16. The system of Claim 13, wherein the at least one real detector array comprises at least one two-dimensional flat panel detector.

17. The system of Claim 13, wherein the virtual detector array is equilinear.

18. The system of Claim 13, wherein the virtual detector array is equiangular.

19. The system of Claim 13, wherein the at least one real detector array comprises at least two detectors configured to obtain projection data at two or more positions.

20. The system of Claim 19, wherein the at least two detectors are disposed end-to-end, and angled relative to one another to approximate an arc having a radius centered at a focal spot of the source.

21. The system of Claim 13, wherein the at least one real detector array comprises at least one detector movable to two or more positions to obtain projection data.

22. The system of Claim 13, wherein the virtual detector array comprises an array of equally-spaced virtual pixels.

23. The system of Claim 22, wherein the data process reprojects data by assigning a radiation amplitude value to each virtual pixel based upon a measured radiation amplitude value of a corresponding real pixel that intersects a line between the virtual pixel and the radiation source.

24. A system for imaging an object using radiation, comprising:

means for obtaining projection data from at least one real detector array, the at least one real detector array obtaining projection data at two or more positions, and having a geometry that is neither equilinear nor equiangular;

means for reprojecting the projection data onto a virtual detector array that has a geometry that is either equilinear or equiangular; and

means for reconstructing the reprojected data from the virtual detector array.